

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 0 833 774 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
07.08.2002 Bulletin 2002/32

(51) Int Cl.7: **B65B 31/06**

(86) International application number:  
**PCT/FI96/00313**

(21) Application number: **96919834.0**

(87) International publication number:  
**WO 96/41743 (27.12.1996 Gazette 1996/56)**

(22) Date of filing: **31.05.1996**

**(54) METHOD FOR CLOSING A LIQUID PACKAGING CONTAINER**

**VERFAHREN ZUM VERSCHLIESSEN EINER FLÜSSIGKEITSVERPACKUNG**

**PROCEDE DE FERMETURE D'UN RECIPIENT D'EMBALLAGE POUR LIQUIDES**

(84) Designated Contracting States:  
**DE ES FR GB IT NL SE**

• **MYKKÄNEN, Ensio**  
**FIN-37640 Valkeakoski (FI)**

(30) Priority: **13.06.1995 FI 952903**

(74) Representative: **Görg, Klaus, Dipl.-Ing. et al**  
**Hoffmann Eitle,**  
**Patent- und Rechtsanwälte,**  
**Arabellastrasse 4**  
**81925 München (DE)**

(43) Date of publication of application:  
**08.04.1998 Bulletin 1998/15**

(73) Proprietor: **UPM-Kymmene Oy**  
**37601 Valkeakoski (FI)**

(56) References cited:

**EP-A- 0 063 235**

**CH-A- 591 375**

**FR-A- 1 497 690**

**GB-A- 2 069 872**

**US-A- 2 889 674**

**US-A- 4 602 473**

(72) Inventors:

• **KLEEMOLA, Pertti**  
**FIN-37600 Valkeakoski (FI)**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

## Description

### Field of the invention

[0001] This invention relates to a method for closing a liquid packaging container to reduce the oxygen content of the gas remaining inside the container, the container comprising a casing - which includes body, cover and bottom parts - and a single opening on the cover part for filling, the said method including three steps as specified in the preamble of claim 1.

### Background of the invention

[0002] The problem that arises when closing liquid packaging containers such as described above, which have been filled through a fill opening on a container when the casing is ready, is that there unavoidably remains oxygen gas inside the container. Typically, when a container is filled it cannot be filled completely, there remains an air space inside the container. Frequently the liquid fed into the container also foams which in itself prevents the complete filling of the container. An empty space inside the container is deleterious, if the gas that fills this space contains oxygen, since the presence of oxygen essentially reduces the period of time when the quality of the liquid inside the container is good.

[0003] Attempts have been made to minimize the aforesaid problem by leading essentially oxygen-free gas into the container through the fill opening after the container has been filled, for example carbon dioxide, saturated water vapour or preferably nitrogen. Such rinsing with oxygen-free gas may help cutting the oxygen content of the gas remaining inside the container perhaps to the half. This is the best result to be achieved by such method, firstly because oxygen-free gas discharges from the container before it can be closed, and secondly because the oxygen within the liquid foam which may be present inside the container cannot be displaced by such rinsing with oxygen-free gas.

[0004] EP-A-0063235 and FR-A-1497890 disclose a method for closing a packaging container, respectively. The amount of oxygen remaining inside the container above the filled product is reduced by feeding at least essentially oxygen free gas into the space inside the container. The gas is introduced into the free space above the filled product by lifting the cover of the container at least partially. The cover is lifted at two portions of the junction between the cover and the body part of the container, the portions being opposite of each other, such that the oxygen free gas flows into the container through the first opening and leaves the container through the second opening. The cover parts are flexible such that a feeding nozzle can be introduced between the cover part and the bottom part of the casing and the cover part and the body part can be closed together after retracting the feeding nozzle.

### Summary of the invention

[0005] The aim of the present invention is to introduce a method which when applied helps essentially reducing the oxygen content of the gas remaining inside a liquid packaging container. This is achieved by using a method according to the invention, characterized in that a closing flap is placed on top of the fill opening either before or after the container is filled and it is first attached only partly to the part of the cover part that surrounds the fill opening; after the container is filled, a feed nozzle is lead into the container through the gap between the edge of the fill opening and the closing flap; through the feed nozzle, gas which is at least essentially oxygen-free is fed into the container; the feed nozzle is removed from the container through the gap between the edge of the fill opening and the closing flap, and the closing flap is pressed against the part of the cover part that surrounds the fill opening and attached to this part to close the container.

[0006] By applying a method according to the invention, mechanical measures can be used to avoid the discharge of oxygen-free gas from the interior of the container before it is closed. Furthermore, by feeding oxygen-free gas with a suitable feed nozzle and as close as possible to the surface of the liquid inside the container, the air, i.e., the gas which contains oxygen can be effectively displaced from the container and lead out through the gap between the closing flap and the fill opening.

[0007] A method according to the invention can be further improved if an additional stage is included where at least essentially oxygen-free gas is fed into a container when the casing is ready before the container is filled with liquid. Such rinsing which takes place before the container is filled helps significantly reducing the oxygen content of the foam bubbles which may form when liquid is fed into the container. Thus the foam inside the container contains essentially less oxygen gas than what it would if it had not been rinsed in advance. Now that the empty space remaining inside the container is further rinsed with oxygen-free gas, an essentially lower oxygen content is achieved inside the container. It is possible to reach an oxygen content as low as a few per cent which significantly improves the keeping of the liquid inside the container.

### Brief description of the attached drawing

[0008] In the following, a method according to the invention is described in more detail with reference to the attached drawing illustrating the performance of a method according to the invention.

### Detailed description of the preferred embodiments

[0009] As an example solution, a cylindrical liquid packaging container is illustrated in the drawing, com-

prising a casing (1) which includes a cylindrical body part (2) and cover and bottom parts (3 and 4) attached to the ends of the body. In this example, a fill opening (5) is formed on the cover part (3) which later, when the container is used, can operate as a pour spout or a drink opening. A container according to the invention is made of paperboard based material laminated with suitable plastic layers to make it as liquid impermeable and gas tight as necessary. However, the casing could also be made of metal, such as steel or aluminium, or plastic.

[0010] When the casing (1) of the liquid packaging container is ready, the container is filled through the fill opening (5) with liquid (6). At this stage it can only be filled partly because the liquid typically foams and some room must therefore be left for the foam, although during the filling foam is typically sucked from the container, e.g., through a suction hose coaxially fitted around the feed nozzle which feeds liquid into the container. Another reason why the container cannot be filled completely is that in the next stage the container must be closed with a closing flap (7) and it is impossible to attach the closing flap to the cover (3), typically by heat sealing, if the closing flap is not dry. Just for this reason alone the container cannot be filled too full, to avoid the risk of liquid spilling on the cover (3) before the closing flap (7) is attached.

[0011] In a method according to the invention, a closing flap (7) is placed on top of the fill opening (5) on the cover (3) either before or after the container is filled, but at this stage the closing flap is attached to the cover (3) only partly, from the area marked in the drawing as (7a). If the closing flap is attached to the cover already during the filling it has to be folded aside to some extent while the container is being filled. The advantage of attaching the closing flap to the cover before the filling is that it can be sterilized together with the rest of the container. Whether the closing flap is attached from the area (7a) to the cover before or after the container is filled, the desired end result is in any event that the end part (7b) of the closing flap remains to some extent apart from the cover (3) so that after the container has been filled, a feed nozzle (8) can be lead through the gap between the closing flap part (7b) and the edge of the fill opening (5) on the cover (3) into the container. Another method that can be used is naturally that the area (7b) of the closing flap (7) is at first kept clearly apart from the cover (3) and it is not pressed closer to the cover (3) before the feed nozzle (8) has been lead into the container. What is essential is that the gap between the closing flap (7) and the cover (3) is as small as possible when the feed nozzle (8) has been placed inside the container.

[0012] At the next stage, essentially oxygen-free gas is fed into the container through the feed nozzle (8), e.g., carbon dioxide, saturated water vapour or perhaps preferably nitrogen. After the feed nozzle has been placed relatively close to the surface of the liquid (6) inside the container, the gas coming from the feed nozzle spreads first along the surface of the liquid, pushing the

air inside the container from underneath out through the fill opening (5). The amount of gas fed through the feed nozzle (8) is optimized so that an oxygen content as low as possible is achieved in the gas space inside the container, yet with the minimum amount of oxygen-free gas since the gas is typically relatively expensive.

[0013] Next, the feed nozzle (8) is pulled out from the container and, immediately after this, the area (7b) of the closing flap (7) is pressed against the cover (3) and attached to it by, e.g., heat sealing. Naturally, all other conventional attaching methods can be used.

[0014] The methods described above help reducing the oxygen content of the gas remaining inside the container to perhaps a quarter of the oxygen content in the air. However, a better end result can be achieved if the interior of the container is rinsed with oxygen-free gas before the container is filled with liquid. In this case, the air inside the container is first displaced to as great extent as possible and replaced with oxygen-free gas, and only after this liquid is fed into the container, the result of which is that instead of oxygen gas, the liquid foam created inside the container contains essentially oxygen-free gas used to replace air. This additional procedure, which nevertheless increases the cost rather significantly since relatively large amounts of oxygen-free gas must be used, helps further reducing the oxygen content of the gas remaining inside the container to very little, perhaps a few per cent. This procedure improves the storing of the liquid inside the container significantly.

[0015] Above, a method according to the invention is described only in connection to one example container type and understandably the method can be applied to all similar liquid packaging containers into which the liquid is fed when the casing is ready through a smallish fill opening.

#### Claims

1. A method for closing a liquid packaging container having a smallish fill opening to reduce the oxygen content of the gas remaining inside the container, when the container comprises a casing (1) - which includes a body part (2), cover part (3) and bottom part (4) - and a single opening (5) on the cover part for filling, the said method including the filling of a container when the casing is ready with liquid (6) through the fill opening (5), the feeding of at least essentially oxygen-free gas into the still free space inside the container, and the closing of the container by attaching a closing flap (7) on top of the fill opening, characterized in that,

the closing flap (7) is placed on top of the fill opening (5) either before or after the container is filled, and it is first attached only partly to the cover part (3) surrounding the fill opening (5),

after the container is filled, a feed nozzle (8) is lead into the container through a gap between the

edge of the fill opening and the closing flap, through which the aforesaid at least essentially oxygen-free gas is fed,

the feed nozzle (8) is removed from the container through the gap between the closing flap (7) and the edge of the fill opening (5) and

the closing flap (7) is pressed against the cover part (3) surrounding the fill opening and attached to this part to close the container.

2. A method according to claim 1, characterized in that it includes an additional stage where at least essentially oxygen-free gas is fed into the container when the casing (1) is ready before the container is filled with liquid (6).

#### Patentansprüche

1. Verfahren zum Schließen eines Flüssigkeitsverpackungsbehälters mit einer kleinen Füllöffnung zum Verringern des Sauerstoffanteils des Gases, das im Inneren des Behälters verbleibt, wobei der Behälter ein Gehäuse (1) umfasst - das ein Körperteil (2), ein Deckelteil (3) und ein Bodenteil (4) umfasst - und eine einzige Öffnung (5) auf dem Deckelteil zum Befüllen, wobei das Verfahren das Befüllen eines Behälters mit Flüssigkeit (6) durch die Füllöffnung (5) umfasst, wenn das Gehäuse fertig ist, das Zuführen von mindestens im wesentlichen sauerstofffreien Gases in den noch freien Raum im Inneren des Behälters und das Schließen des Behälters durch Anbringen einer Schließlasche (7) auf der Oberseite der Füllöffnung, dadurch gekennzeichnet, dass die Schließlasche (7) auf der Füllöffnung entweder vor oder nach dem Befüllen des Behälters platziert wird, und zuerst nur teilweise an dem Deckelteil (3), das die Füllöffnung (5) umgibt, angebracht wird, nachdem der Behälter befüllt ist, eine Zuführdüse (8) in den Behälter durch einen Spalt zwischen dem Band der Füllöffnung und der Schließlasche geführt wird, durch die das erwähnte zumindest im wesentlichen sauerstofffreie Gas zugeführt wird, die Zuführdüse (8) von dem Behälter durch den Spalt zwischen der Schließlasche (7) und dem Rand der Füllöffnung (5) entfernt wird, und die Schließlasche (7) gegen das Deckelteil (3) gedrückt wird, das die Füllöffnung umgibt und an diesem Teil in der Nähe des Behälters angebracht wird.
2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass es einen zusätzlichen Schritt umfasst, in dem zumindest im wesentlichen sauerstoff-freies Gas in den Behälter gefüllt wird, wenn das Gehäuse (1) fertig ist, bevor der Behälter mit Flüssigkeit (6) gefüllt wird.

#### Revendications

1. Procédé destiné à fermer un récipient de conditionnement de liquide présentant une ouverture de remplissage assez petite pour réduire le contenu en oxygène du gaz restant à l'intérieur du récipient, lorsque le récipient comprend une enveloppe (1) - qui comprend une partie de corps (2), une partie de couvercle (3) et une partie de fond (4) - et une ouverture unique (5) sur la partie de couvercle pour le remplissage, ledit procédé comprenant le remplissage d'un récipient lorsque l'enveloppe est prête avec du liquide (6) par l'intermédiaire de l'ouverture de remplissage (5), l'alimentation d'un gaz au moins essentiellement exempt d'oxygène dans l'espace encore libre dans le récipient, et la fermeture du récipient en fixant un volet de fermeture (7) sur l'ouverture de remplissage, caractérisé en ce que on place le volet de fermeture (7) sur le dessus de l'ouverture de remplissage (5) soit avant soit après que le conteneur a été rempli et on le fixe d'abord partiellement seulement à la partie du couvercle (3) entourant l'ouverture de remplissage (5), lorsque le récipient est rempli, on fait entrer une buse d'alimentation (8) dans le récipient par l'intermédiaire d'un jeu entre le bord de l'ouverture de remplissage et le volet de fermeture, par l'intermédiaire de quoi on alimente le gaz au moins essentiellement exempt d'oxygène précédemment mentionné, on enlève la buse d'alimentation (8) du récipient dans le jeu entre le volet de fermeture (7) et le bord de l'ouverture de remplissage (5) et on presse le volet de fermeture (7) contre la partie de couvercle (3) entourant l'ouverture de remplissage et fixée à cette partie pour fermer le récipient.
2. Procédé selon la revendication 1, caractérisé en ce qu'il comprend un stade supplémentaire dans lequel on alimente un gaz au moins essentiellement exempt d'oxygène dans le récipient lorsque l'enveloppe (1) est prête avant de remplir le récipient de liquide (6).

